

Post-arrival TB Screening of the High-Risk Refugees and Immigrants in Maryland



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Objectives

- Review TB disease and infection among foreign-born persons in the United States and Maryland
- Review TB disease among B-waivers at the Baltimore City Health Department
- Review data on symptoms and CXR findings among immigrants with active TB
- Discuss Maryland TB screening protocol for B waivers



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B-Waivers

Table 1 Comparison of tuberculosis classification systems for refugees being screened for US resettlement:

CDC DGMQ classification	Description
Normal	Normal
Class A	Infectious and active
Class B1 (pulmonary/extra-pulmonary)	Non-infectious and active
Class B2	Non-infectious and inactive: latent tuberculous infection
Class B3	Non-infectious exposure

- All Class B immigrants are to report to local health department
- 84% of TB cases in foreign-born residents of the United States are attributable to progression of LTBI acquired in the patient's home country



TB in the United States

- 9,421 cases in 2014
 - Foreign-born: 66%
 - Maryland: 81%
 - Primary MDR TB between 1993-2014
 - Foreign-born: 25% → 85%
 - 2009-2014: 15 XDR cases; 11 foreign-born

Primary Reason for TB Evaluation, 2014

Reporting area	Total	TB symptoms	Abnormal CXR	Immigrant Med Exam	Other
United States	9421	5423 (57.6)	1934 (20.5)	203 (2.2)	1861 (19.7)
Maryland	198	126 (63.6)	43 (21.7)	4 (2)	25 (12.7)



TB in the United States

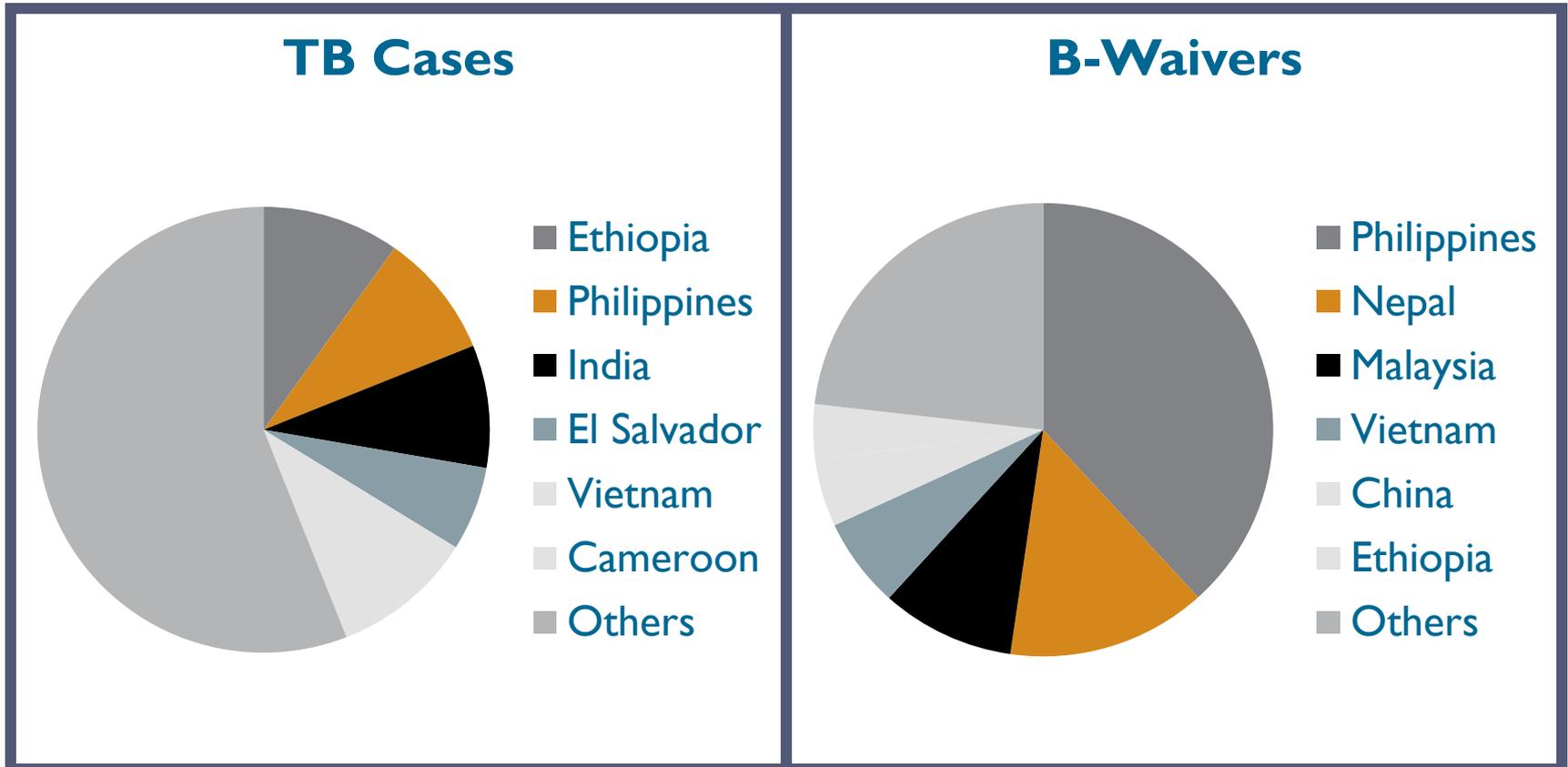
TB Cases and Percentages in Foreign-born Person by Immigration Status at First Entry, 2014

Reporting area	Total	Immigrant Visa	Refugee	Asylee or Parolee	Other
United States	6215 (66)	1486 (23.9)	402 (6.5)	30 (0.5)	4297 (69)
Maryland	160 (81)	67 (41.9)	10 (6.3)	3 (1.9)	80 (50)

TB Cases and Percentages in Foreign-born Person by Number of Years in the US, 2014

Reporting area	Total	< 1 year	1-4	5-9	10-19	≥20	Unknown
United States	6215 (66)	995 (16)	919 (14.8)	848 (13.6)	1168 (18.8)	1705 (27.4)	580 (9.3)
Maryland	160 (81)	40 (25)	33 (20.6)	24 (15)	36 (22.5)	25 (15.6)	2 (1.3)

Maryland B-Waivers, 2008-2012



Maryland B-Waivers, 2008-2012

- 1,488 B-waivers:
 - Immigrants: 70%
 - Refugees: 28%
 - Asylees: 2%

- LTBI: 675 (52% → 66% treated)
 - Immigrants: 43% LTBI (59% treated)
 - Refugees: 52% LTBI (81% treated)
 - Asylees: 31% LTBI (44% treated)



Maryland B-Waivers, 2008-2012

- Refugees more likely to be LTBI ($p < 0.001$)
- Active TB: 19 (<1%)
 - 75% male
- Median time from arrival to evaluation: 40 days

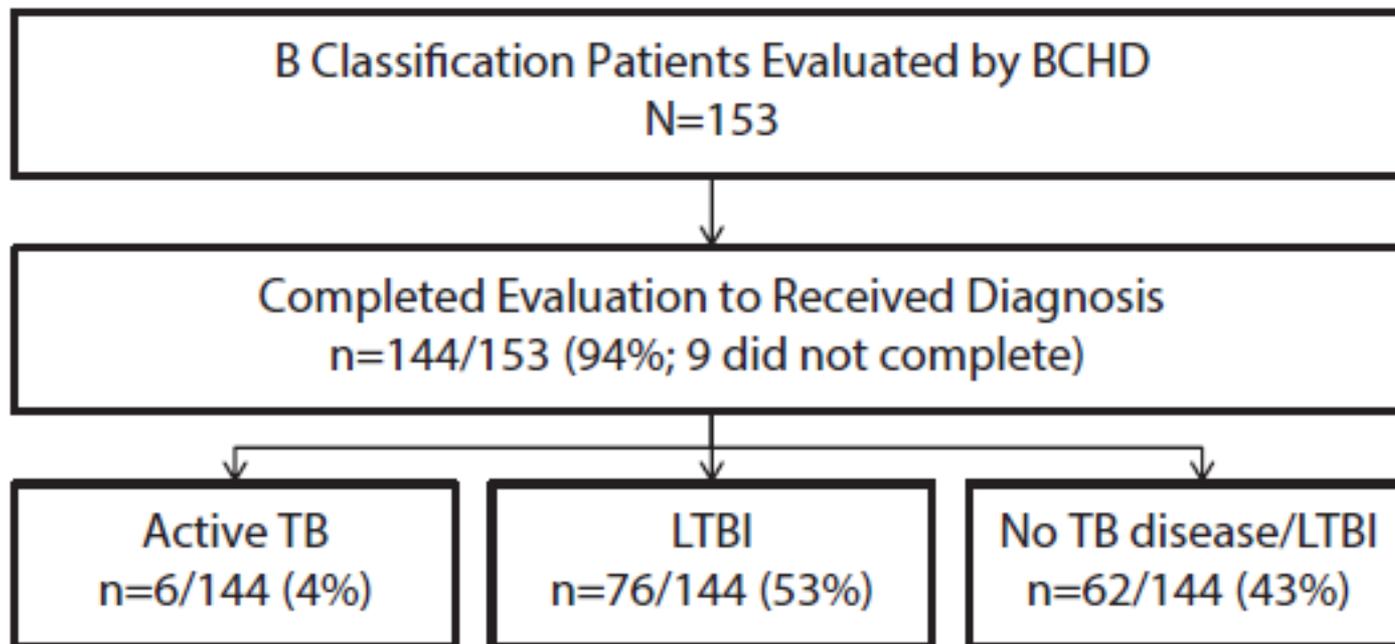


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Baltimore City retrospective review of B-waivers 2010-2012



Baltimore City retrospective review of B-waivers 2010-2012

- Country of origin
 - Nepal: 64%
 - Philippines: 12%
 - Ethiopia: 6%
- Median time to evaluation: 75 days (IQR 55-98 days)
- Median time from pre-immigration CXR to evaluation
 - 201 days (IQR 169-241 days)



Baltimore City retrospective review of B-waivers 2010-2012

Characteristic	B1 (n=108) No. (%)	B2 (n=43) No. (%)	B3 (n=2) No (%)	All classes	P
Any symptoms at time of evaluation	19 (18)	1 (2)	0 (0)	20 (13)	.034
Abnormal post-immigration CXR	62 (57)	3 (7)	0 (0)	65 (43)	<.001
Completed med eval	99 (2)	43 (100)	2 (100)	144 (94)	-
Active TB	5 (99)	1 (2)	0 (0)	6 (144)	-
LTBI	39 (39)	35 (43)	2 (100)	76 (53)	-
No current LTBI/TB	55 (56)	7 (43)	0 (0)	62 (43)	<.001

B1: 71%

B2 28%



Active cases among BCHD B-waivers

	Active TB (n = 6), No. (%) or Median (IQR)
B classification	
B1	5/6 (83%)
B2	1/6 (17%)
B3	0/6 (0%)
Gender	
Female	1/6 (17%)
Male	5/6 (83%)
Age, y	29 (14-30)



Active cases among BCHD B-waivers

History of prior TB noted in preimmigration paperwork	1/6 (17%)
Days from entry to country to evaluation by BCHD	105 (63-125)
Abnormal preimmigration chest X-ray	5/6 (83%)
Infiltrate or consolidation	2/5 (40%)
Any cavitary lesion	0/5 (0%)
Nodule with poorly defined margins	0/5 (0%)
Pleural effusion	0/5 (0%)
Hilar mediastinal adenopathy	0/5 (0%)
Linear interstitial markings	0/5 (0%)
Discrete fibrotic scar or linear opacity	1/5 (20%)
Discrete nodule without calcification	1/5 (20%)
Discrete fibrotic scar with volume loss or retraction	1/5 (20%)
Other	0/5 (0%)
Abnormal postimmigration chest X-ray	5/6 (83%)
Reported symptoms	2/6 (33%)
Received sputa testing	2/2 (100%)
Culture positive	1/2 (50%)
Did not report symptoms	4/6 (67%)
Received sputa testing	4/4 (100%)
Culture positive	2/4 (50%)



Active cases among BCHD B-waivers

- 6 active cases
 - 1 pulmonary and extrapulmonary (spine)
 - 2 pediatric
 - 3 Nepal/Bhutan, 2 Ethiopia/Eritrea, 1 Iraqi
 - 1 treated 30 years prior
 - 5 in US 1 year; 1 1.5 year
 - 1 contact with LTBI
 - All HIV negative



Active cases among BCHD B-waivers

- No DM, HIV, homeless, smoking, IVDU/EtOH
- 5 abnormal post-immigration CXR:
 - 1 infiltrate
 - 1 infiltrate and LUL fibrosis
 - 1 nodule (symptomatic)
 - 1 hilar masslike opacity (symptomatic)
 - 1 medistinal/hilar LAD



Active cases among BCHD B-waivers

- 4 cases asymptomatic
 - Evaluated based on radiographic features/clinical exam
 - 2/4 culture positive
 - All received 6 months of HRZE
 - 1 previously treated X 18 months
 - 1 B2



Active cases among BCHD B-waivers

- 2 cases symptomatic
 - 1 with cough and hemoptysis
 - 1 with cough, weight loss, poor appetite
 - 1 with + contact
 - 1 with TB spine + pulm TB



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Active Disease in Immigrants

- BCHD 2010-2012: 4% active
- 2010 analysis of CDC EDN
 - Children 2-14 with LTBI diagnosis upon arrival; 3% active
- San Diego analysis of adults 2010-2012
 - 4280 refugees with LTBI; 1.5% active
- 124,114 Filipino immigrants to California, followed 9 years; 0.6% active
 - 72% in first year of immigration



Asymptomatic TB in foreign-born cases

- 1830 inmates entering a federal detention center in San Diego during 6 months in 1998
 - 16 cases
 - 60% foreign born
 - 81% asymptomatic
 - 94% with abnormal CXR



Asymptomatic TB in foreign-born cases at 20 US sites

980 TB patients who reported their visa status, stratified by time from US arrival to diagnosis, 2005-2006

Characteristic	No (% of total) or Median (IQR)
Persons with TB diagnosed within 6 months of arrival (n=151)	
Symptoms before diagnosis	
With symptoms	83 (52.3)
No symptoms	68 (47.7)
Persons with TB diagnosed \geq 6 months after arrival (829)	
Time since arrival	
6-11.9 months	47 (6)
1-2 y	68 (8)
3-5 y	183 (22)
>5	531 (64)
Symptoms before diagnosis	
<50 d before	214 (25.2)
50-175 d before	234 (26.2)
>175 d before	213 (24.4)
No symptoms	168 (24.1)



Chest X Rays and TB diagnosis

- Evaluation of foreign-borne persons diagnosed with TB in the US between 2001-2006
 - 46,970 total cases
 - 28% diagnosed within 2 years of entry

Reported TB Cases among Foreign-Born Persons in the United States Less than 3 and 6 months,

Time since entry, months	No of cases	Pulm cases	Abnormal CXR		Normal or no CXR		Neg smear, neg culture
			Pos smear	Neg smear, pos culture	Pos smear	Neg smear, pos culture	
<3	4499	4104 (91)	1211 (30)	1502 (37)	31 (1)	101 (2)	1259 (31)
<6	6835	6036 (88)	1924 (32)	2066 (34)	40 (1)	133 (2)	1873 (32)



Pre-immigration screening, symptoms, CXR

- 83,214 persons screened in China between 2009-2010
 - 270 cases
 - 81% asymptomatic
 - 92% with abnormal CXR
- 14,098 persons screened between 1998-1999 in Vietnam
 - 183 cases
 - 82% symptomatic
 - All had abnormal CXR



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Maryland B-waivers, 2013-2015

Characteristic	N=518	%
Fibrosis on CXR	58	11
BI	53	91
Immigrants	49	85
Refugees	7	12
Asylees	1	2
Sputum collected	49	85
Sputum positive for MTB	2	4

Fibrosis= “fibrosis,” “apical” or “upper lobe” scarring, and “pleural fibrosis”



Optimal screening for B-waivers?

	Baltimore City	Maryland	Virginia	Minnesota	Curry Center
B1	Obtain sputa if symptoms OR abnormal CXR	Obtain sputa if symptomatic	Obtain sputa	Obtain sputa if symptomatic	Obtain sputa
B2	Obtain sputa if symptoms OR abnormal CXR	Obtain sputa if symptomatic			

- Are symptoms a good screening tool?
- Are CXRs a good screening tool?
 - Mean time to pre-immigration CXR and evaluation 201 days
- Is it practical to obtain CXR and have patient come back?

